OPERATION

5700143203

TASCAM

TEAC Professional Division

SY-88

Synchronizer Board for DA-88

OWNER'S MANUAL

1. Introduction

The SY-88 is a synchronizer equipped with a longitudinal timecode generator, which offers interlock between the DA-88, other digital audio machines, analog tape recorders and VTRs via SMPTE/EBU timecode. Among the tasks it performs :

- Generation of, and synchronization by referencing to, 30, 29.97 Non-Drop, 29.97 Drop, 25, and 24 frame format codes.
- Offset sync with subframe accuracy.
- Automatic offset entry on the fly.

❑ Precautions and Recommendations

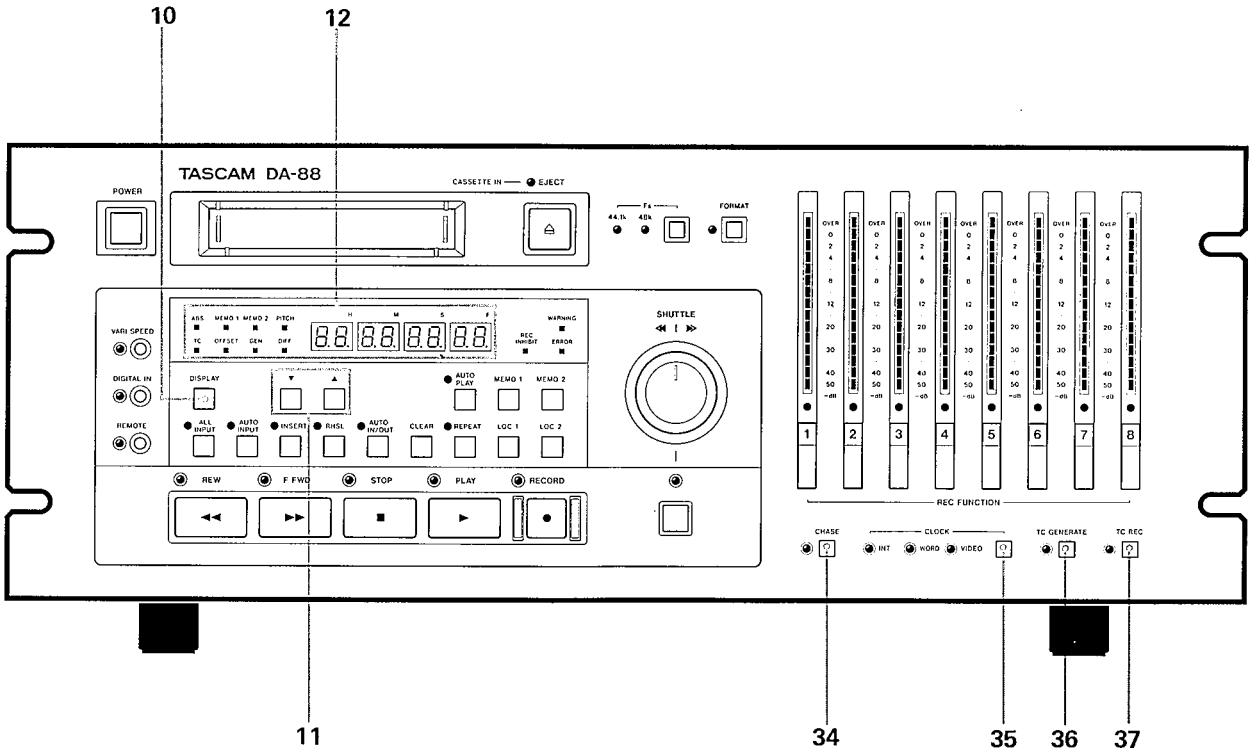
- To prevent problems, before attempting any cable connections check to make sure all units involved in your system are turned off.
- Be sure to record timecode over the entire length of every tape.
- Set the timecode starting time so that timecode recording will be complete before overrunning the 24-hour point (24:00:00:00). Otherwise, timecode is not correctly recorded.
- The same timecode must be recorded on both the master and slave tapes or else erratic synchronization will occur. If a tape you intend to load on the master machine is prestriped with any timecode, record this type of timecode on the DA-88 tape too.
- When recording program material, allow sufficient leader tape ahead of each of them. Similarly, allow a sufficient postroll time behind the end of the last program on a given tape.

THE APPLIANCE CONFORMS WITH EEC DIRECTIVE 87/308/EEC REGARDING INTERFERENCE SUPPRESSION

CONFORME AL D.M. 13 APRILE 1989
DIRETTIVA CEE/87/308

TABLE OF CONTENTS

2. DA-88 Controls



When the SY-88 is installed into the DA-88, this provides the same functions as when the SY-88 is not installed EXCEPT THE FOLLOWING. For all other information on the DA-88, please refer to its manual.

10. DISPLAY Switch

Each time you press this switch, the following will show in sequence :

1. ABS time (ABS LED lit)
2. MEMO 1 location (MEMO 1 LED lit)
3. MEMO 2 location (MEMO 2 LED lit)
4. Pitch change (PITCH LED lit)
5. Timecode from the DA-88 tape (TC LED lit)
6. Frame-accurate offset (OFFSET LED lit)
7. Subframe-accurate offset (OFFSET LED lit)
8. Timecode from the internal TC generator (GEN LED lit)
9. Frame-accurate difference between the master and slave timecode numbers (DIFF LED lit)
10. Subframe-accurate difference between the master and slave timecode numbers (DIFF LED lit)

    Pressing only ▲ in the "subframe-accurate" DIFF mode brings you back to the "frame-accurate" DIFF mode.

In TC mode (5) you can select the desired type of timecode.

The GEN mode (8) allows setting the generator start time.
If the generator is generating timecode and this is feeding the TIME CODE OUT jack, the timecode numbers will increment in the display, during which the generator start time cannot be set.

The frame-accurate DIFF mode (9) shows *absolute* difference between the master and slave timecode numbers. Once locked together, the display shows *relative* difference (= absolute difference - offset value).

Displays 5-10 are available only when the DA-88 is ID- numbered "0" and the SY-88 is installed into that machine.

- To go back directly to the ABS time display mode, hold **DISPLAY** and press the ▲ key.
- To skip directly to the TC mode, hold **DISPLAY** and press the ▼ key.

11. ▼ and ▲ Keys

These keys have multiple uses.

(1) They are used to enter the following :

- Offset time (frame or subframe accuracy)
- Start time of the internal TC generator (frame accuracy)

In addition to
- MEMO 1/2 point (frame accuracy)
- Pitch change (0.1% accuracy)

For the last two, refer to the manual for the RC-848 and/or DA-88.

(2) If the display shows ABS time and you hold either of the keys (▼/▲) and press the other, the display switches to show timecode numbers. Pressing DISPLAY brings you back to the ABS time display mode.

(3) When the display is in TC mode, each time you press either key (▼/▲) while holding the other, the following timecode options will switch in sequence :

30, 29.97 Non-drop, 29.97 Drop, 25, and 24 frame formats.

Pressing DISPLAY brings you back to the normal TC display mode.

(4) The keys are also used to let the display show the type of timecode being read off a tape inserted to the DA-88. To do so :

1. Hold **DISPLAY** and press ▼. Timecode numbers will increment in the display as the tape plays.
2. Hold either ▼ or ▲ and press the other. The display will switch to show the currently *selected* code format.
3. Press **DISPLAY** again.

- To switch the display back to its TC mode, press **DISPLAY** once more.

(5) If the display shows a frame-accurate difference between the master and slave timecode numbers (see item 10) and you hit either key (▼/▲) while holding the other, the difference time at that moment is put into the offset memory ("auto offset" entry).

(6) Pressing ▲ while holding DISPLAY switches the display to its ABS mode. Pressing ▼ instead of ▲ switches the display to its TC mode.

(7) If, when the display is in the TC mode, you hold down ▲ and press **DISPLAY**, the display is switched to show timecode coming from the exterior (TC LED blinks). Pressing only DISPLAY again switches the display back to the internal TC mode.

12. Digital Display

What the display shows depends on the DISPLAY switch as specified above (paragraph 10).

34. CHASE Key

In addition to syncing DA-88s under ABS-time control, you can also sync them up to other audio or video transports under SMPTE/EBU-timecode control. This manual is intended to provide information on SMPTE/EBU-timecode controlled synchronization only. For ABS-time controlled synchronization, refer to the manual for the RC-848 and/or DA-88.

35. CLOCK Switch

For the DA-88 to function and achieve different tasks, it must be referenced to different clocks. The CLOCK switch offers three options :

INT : The DA-88 is referenced to its internal clock. Use this clock when making a copy from analog tape recorders.

WORD : The DA-88 is referenced to the clock derived from its WORD IN, for syncing up to other digital audio machines, or for making digital copy from these onto the DA-88.

VIDEO : The DA-88 is referenced to the clock derived from its VIDEO IN, for slaving the DA-88 to your VTR or for making a copy of timecode from VTR down to the DA-88.

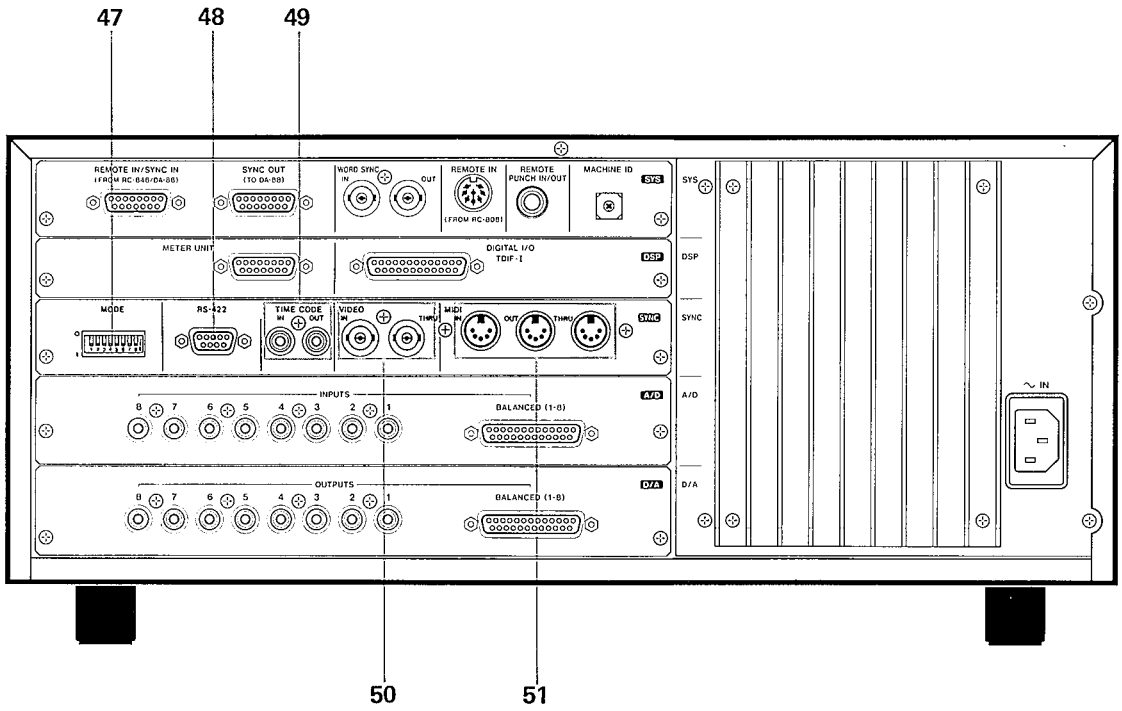
36. TC GENERATE switch

Lets the SY-88's internal timecode generator start generating timecode.

37. TC REC key

Puts the timecode track (subcode area) on the DA-88 into record Ready mode. The associated LED blinks to show record Ready, and glows solid as recording starts.

Rear Panel



47. MODE dip-switches

They are all factory-preset to their Down positions.

1. VIDEO 75-Ω switch

Down : Leave the switch at this position if nothing is plugged into the VIDEO THRU jack.
Up : Set to this position when the VIDEO THRU jack is connected.

2. SERIAL IN switch : Submits the DA-88 to control signal from its RS-422 port or MIDI terminal.

Down : Selects the RS-422 port.
Up : Selects the MIDI IN terminal.

☞ *The RS-422 port can be activated only when the DA-88 is in its timecode (as distinct from ABS time) controlled mode (p. 5-1).*

3. CHASE MODE switch

Down : "Rechase" mode : The SY-88 reads and compares the master and slave timecode numbers constantly to control the slave machine with respect to the master.
Up : "Free" mode : The slave machine (DA-88) is set free from the master after once both are locked together, and starts playing independently of the master.

4. RECHASE switch : Determines the threshold of rechase function (effective only when the #3 CHASE MODE switch is in its Down position).

Down : Each time the difference between the master and slave timecode numbers goes beyond *1 second*, the slave machine will be nudged back into sync.
Up : Selects a threshold of *2 seconds*.

5. TC OUT TIMING switch :

Down : Timecode is sent out in time with respect to the *analog* audio output.
Up : Timecode is sent out in time with respect to the *digital* audio output.

> **IMPORTANT**
> This switch must be set in accordance with the audio outputs you are actually using ; e.g., if the analog outputs are in use, you have to set the switch to its Down position *regardless of whether the DA-88 is in Analog Output mode or in Digital Output (Digital Dubbing) mode.* For these modes, see the DA-88 supplement.

6. MIDI TC source select switch

Down : MTC (MIDI Timecode) translated from SMPTE/EBU code read from the DA-88 tape or generated from the SY-88 is sent out the MIDI OUT jack.
Up : The MIDI OUT jack is fed with MTC derived from the timecode input. No compensation is applied to the signal.

7. V SYNC PB (Video Sync Playback) switch : Determines, when the DA-88 is slaved to a VTR, whether sync is achieved using timecode or the DA-88 locks to rising edges of the video frame ignoring the actual timecode numbers.

Down : For timecode based chase and sync.
Up : The DA-88 locks to rising edges of the video frame.

8. CONTROLLER switch : Depending on the type of controller or editor connected to the ACCESSORY RS-422 port, set this switch as follows :

Down : Leave the switch at this position if your controller is "TYPE 1" and capable of transmitting a chase command.
Up : Set the switch to this position if your controller is "TYPE 2" and does not transmit any chase commands.

☞ *If switch #7 is at Down position, switch #8 has no effect whether this is set to Up or Down position.*

48. ACCESSORY RS-422 port

This connects to any controllers or editors following the Sony P2 protocol (RS-422). If you are in doubt about the compatibility of a controller, please consult TASCAM or the nearest TASCAM dealer.

☞ *This port cannot be used*
(1) at the same time as the MIDI terminals, and
(2) in ABS time (as distinct from timecode) controlled mode.

49. TIME CODE jacks

IN : Timecode from other transports than DA-88 (audio or video) is connected here for the DA-88 to be slaved to them. Similarly, when dubbing timecode between DA-88s, timecode from the master is connected to the TIME CODE IN on the slave.
OUT : Carries timecode coming from the tape inserted to the DA-88 or from the TC generator built into the SY-88.

The output level defaults to 2 Vp-p, and can be set for 0.6 Vp-p by removing a tiny plug inserted into Hi at P2 on the SYNC PCB and reinserting it into Lo.
***Warning** : This should be done only by a qualified service person.*

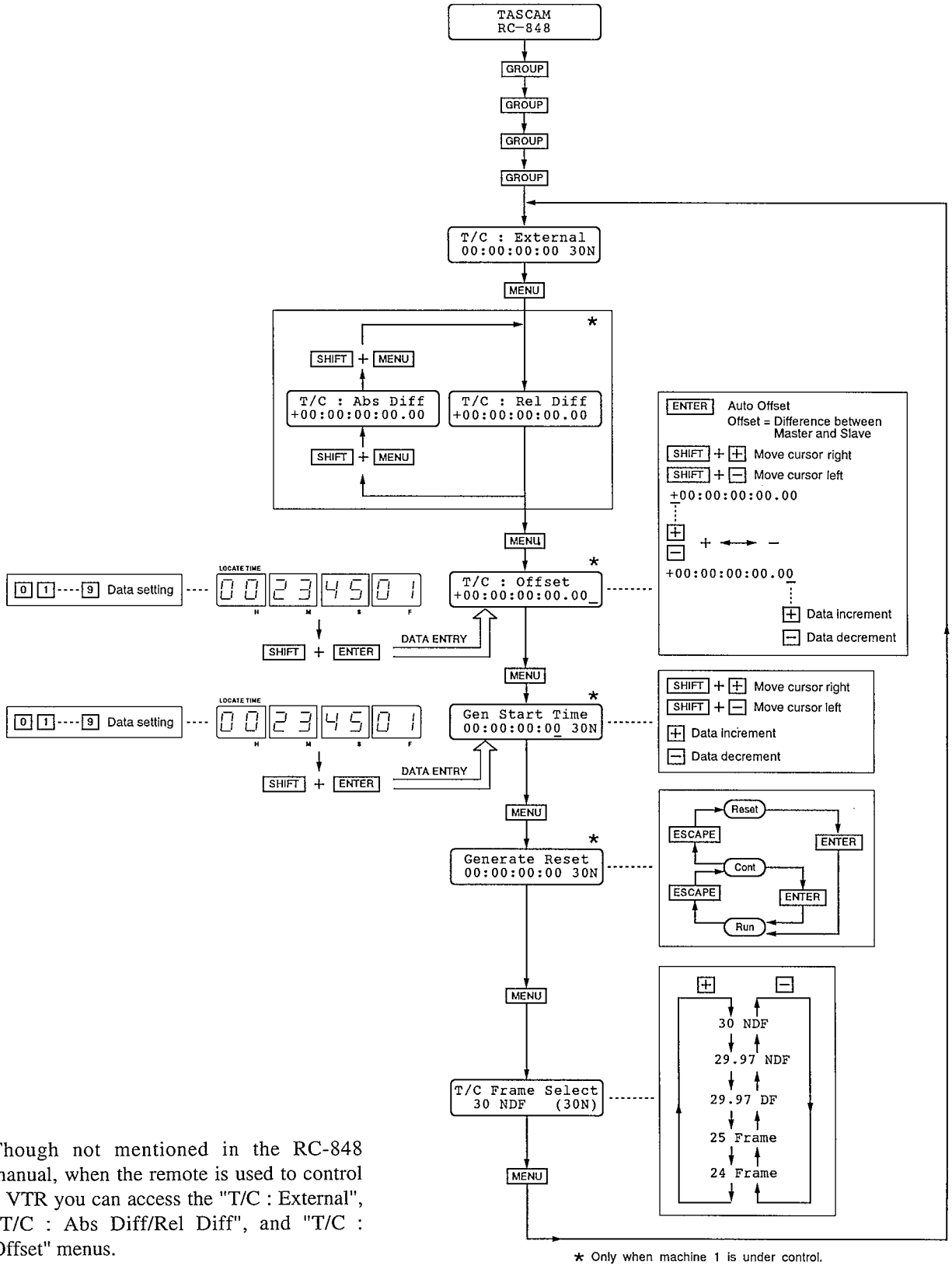
50. VIDEO jacks

IN : Composite video signals from your VTR are connected here.
THRU : Any inputs to the VIDEO IN jack will be "echoed" out this jack.

51. MIDI jacks (see *MIDI diagrams* in APPENDIX).

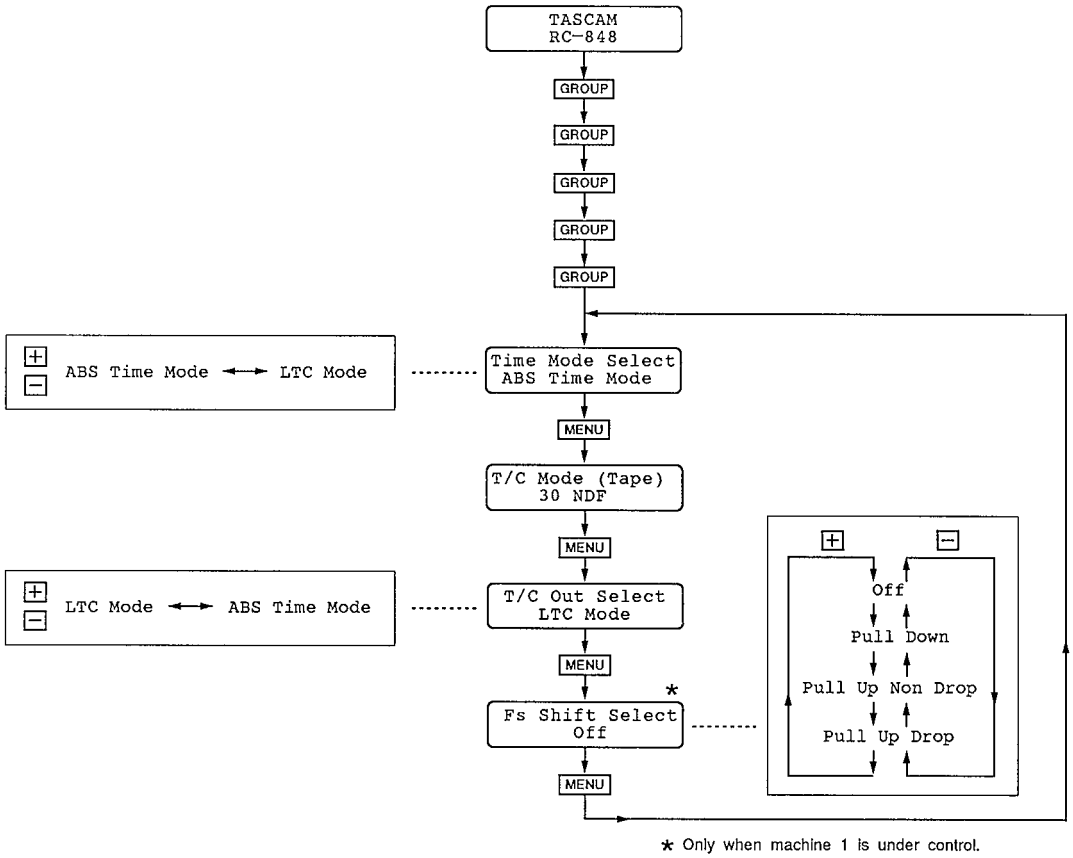
3. RC-848 : Timecode-related Menu Flowcharts

(for those who are using the RC-848 remote control unit)



Though not mentioned in the RC-848 manual, when the remote is used to control a VTR you can access the "T/C : External", "T/C : Abs Diff/Rel Diff", and "T/C : Offset" menus.

* Only when machine 1 is under control.



With the optional RC-848 remote you can :

- Set the timecode generator start time with numeric keys.
- See external timecode numbers.
- See either the relative or absolute difference time at any time.
- Let the LOCATE TIME window read the time the DA-88/SY-88 system counts (i.e. ABS time or timecode numbers), and the LCD screen read timecode numbers from external units.

❑ Menu Functions

T/C : External

Shows the timecode numbers and code format coming into the DA-88/SY-88 system.

The code formats are shown as follows :

Code Format	Display
24 frames	24F
25 frames	25F
29.97 Drop frames	30D
29.97 Non-Drop frames or 30 Non-Drop frames	30N

T/C : Abs Diff/Rel Diff

Shows the current difference between the master and slave timecode numbers. Each time you press MENU while holding SHIFT, the Absolute and Relative differences alternate.

T/C : Offset

At this menu you can enter an offset to the slave machine, either on the fly by hitting ENTER or by inputing the desired numbers with the +/- or numeric keys (pp. 6-2, 3).

Gen Start Time

Allows you to set the time point at which you want the timecode generator built into the SY-88 to start generating timecode. Entry is either with the +/- or the numeric keys (p. 5-2).

Generate Reset

At this menu you can control the SY-88 timecode generator ; this starts when ENTER is pressed ; and stops when ESCAPE is pressed, which activates Generate Continue mode. In the Generate Continue mode, pressing ENTER causes the generator to generate timecode from the interrupted time point ; or pressing ESCAPE brings you back to the initial "reset" display.

T/C Frame Select

Each time you press the + or - key at this menu, the five optional timecode formats will switch in sequence as shown on chart, p. 3-1. If timecode is plugged into the DA-88/SY-88 system, its format is shown in parentheses at the menu while the internal code format is shown at left as you select. Both should be the same.

Time Mode Select

The DA-88/SY-88 system can either be ABS time or timecode (LTC) controlled as selected at this menu. Each time you press the + or - key, ABS and LTC alternate.

T/C Mode (Tape)

Shows what format of timecode is present on the current DA-88 tape. The display is :

30 NDF, 29.97 NDF, 29.97 DF, 25 Frame, or 24 Frame.

T/C Out Select

Offers two options : ABS and LTC. If you select the ABS mode by means of the + or - key, the ABS time is converted into SMPTE/EBU timecode numbers and these are sent out from the timecode output jack. In the LTC mode, the timecode output jack carries the timecode numbers as they are read off tape. For more, see page 7-1.

Fs Shift Select

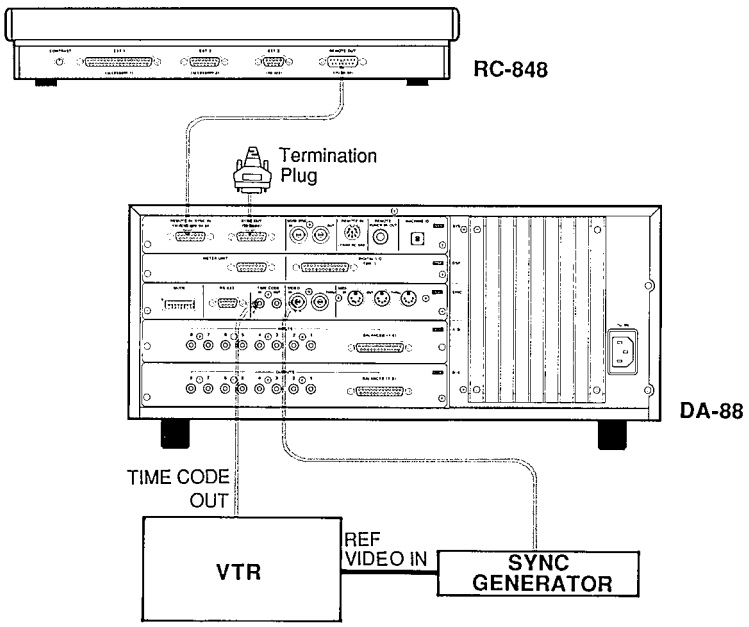
Three options are available: Pull Down, Pull Up Non Drop, and Pull Up Drop. For more, see page 8-1.

4. Hookup

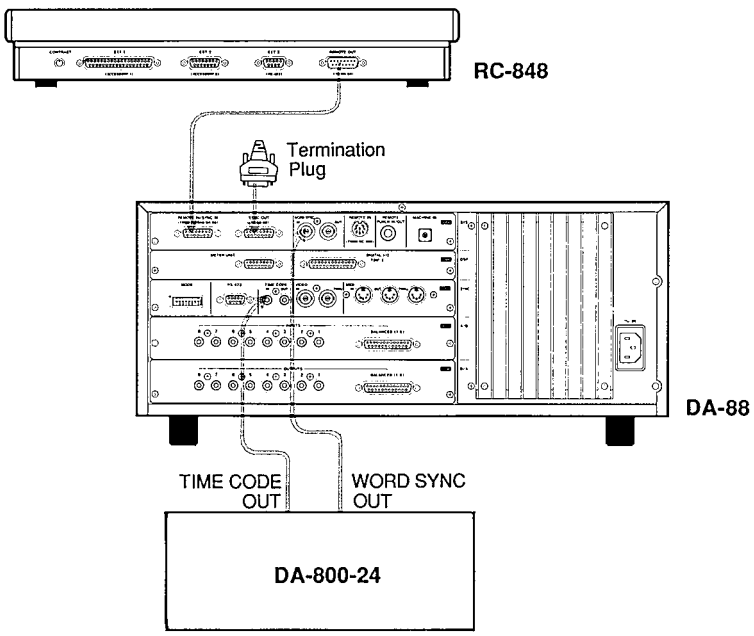
NOTE

Before attempting any cable connections, check to see that your whole system is turned off.

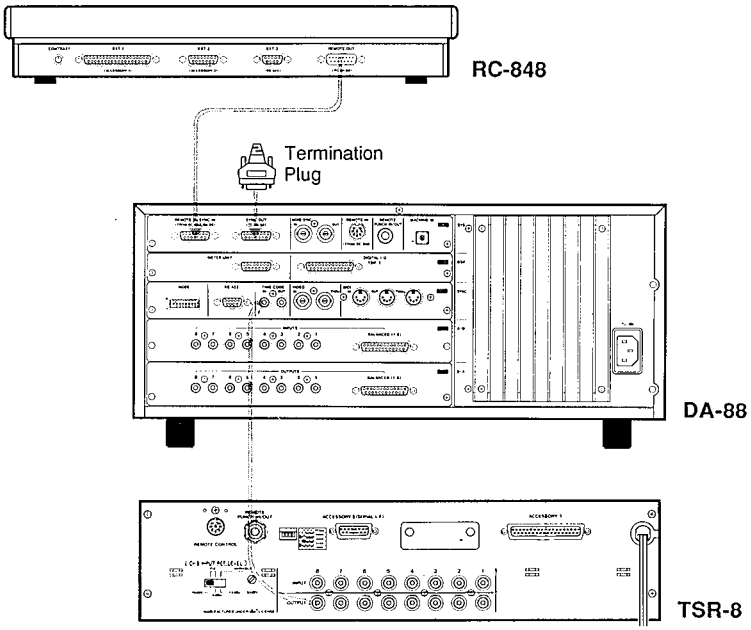
❑ DA-88 Slaved to a VTR



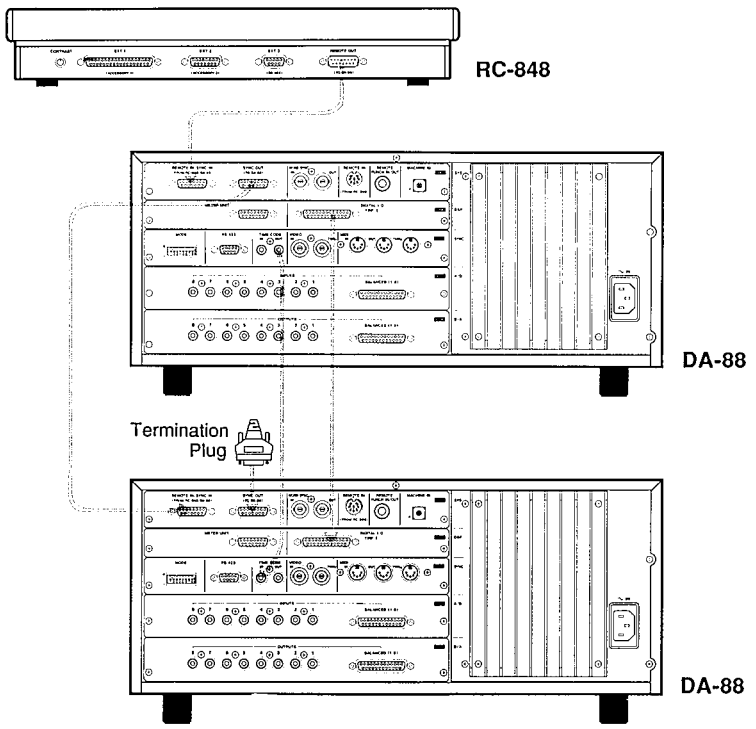
❑ DA-88 Slaved to a Different Digital Audio Machine



❑ DA-88 Slaved to an Analog Tape Recorder



❑ Syncing Two DA-88s



If the SY-88 is installed into both the master and slave DA-88s, program material can be dubbed along with timecode at one time (pp. 5-7, 8).

☞ *Set the SY-88's MODE dip-switches to the appropriate positions by referring to paragraph 47, pp. 2-3, 4.*

5. Striping Timecode

5-1. PRELIMINARY

❑ ABS-to-Timecode Switching

The DA-88/SY-88 system defaults to ABS-time controlled mode. To switch the system to timecode controlled mode, hold either the remote ▼ or ▲ key and press the other when the display is in its ABS time mode (ABS LED lit).

If you are using the RC-848, you can select the timecode controlled mode at the "Time Mode Select" menu (p. 3-3).

Once the system is switched to Timecode mode, punch ins and outs or locating functions also can be controlled via timecode.

❑ Timecode Format Selection

For the DA-88 to be slaved and synced up to other audio machines (digital or analog) or to VTRs, the same type of timecode as the master tape must previously be striped (recorded) on a track of the DA-88. If your system includes any other units which function using timecode, they also should all be set to the same type of timecode.

First, check to see that the MACHINE ID switch on the back of your DA-88 is set to "0."

☞ *If the DA-88 is not ID-numbered "0" you cannot select any timecode formats or set any TC generator start times.*

> **NOTE**
> The type of timecode of both the master and slave machines should be the same. If not, the correct synchronization is not ensured.

The SY-88 defaults to 29.97 Drop frame format. To select other optional code formats :

Without RC-848

1. Hold **DISPLAY** and press ▼. The TC LED will light.
2. Press and hold either the ▲ or ▼ key and press the other. The display will show the default code format.
3. Press the ▲ or ▼ key until the desired code format shows in the display.
4. Press **DISPLAY** to bring you back to the original display.

With RC-848

> **NOTE**
> In the following we only say "Press MENU until (...)" for simplicity. Actually, however, you cannot have access to all menus simply by pressing MENU, as depicted on charts on pages 3-1, 2 of this manual. See also charts on pages 3 to 5 of the RC-848 manual as required.

1. Press **MENU** until the LCD screen reads:

```
T/C Frame Select
    29.97 DF
```

2. Press the **+/–** key until the desired code format shows.

❑ Clock Selection

Depending on the application or the master machine to which your DA-88 is slaved, select the appropriate clock by pressing the CLOCK switch (either on the remote or DA-88) as many times as necessary (see paragraph 35 on page 2-2).

5-2. RECORDING TIMECODE ON THE DA-88

❑ Using the Timecode Generator built into the SY-88

1. Generator Start Time Setting

Without RC-848

1. Press **DISPLAY** until the GEN LED lights.
2. Use the ▼ and ▲ keys to enter the desired timecode point where you want the generator to start generating timecode from. To speed up the entry, you can hold down either ▲ or ▼ and press **DISPLAY**. Each time you press **DISPLAY**, the next upper (left) two digits will "slew."

With RC-848

1. Press **MENU** to get access to the "Gen Start Time" menu.
2. Press the **+/–** key to enter the desired start time. To move the cursor, hold **SHIFT** and press the **+/–** key.
   Alternatively, you can use the **numeric keys** at the "Gen Start Time" menu to enter the desired starting time into the LOCATE TIME window, then hold **SHIFT** and press **ENTER**.

2. Timecode Recording

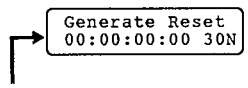
Once the timecode format and start time have been set to your requirements, you can lay down timecode on a dedicated track (in the subcode area) of the tape inserted to the DA-88.

1. Check to see that the VARI SPEED mode is not activated as confirmed by the associated LED being off.

   If you are using the RC-848, you can also press **MENU** to get access to the "Pitch Control" menu to make sure that the menu is set to "Fix."

2. If the tape is not at the very beginning, press **REW** to rewind to the beginning.

3. **With RC-848 Only:** Press **MENU** until the LCD screen reads :

   Actually, the second line shows the start time and timecode format you have selected.

4. Press the **TC REC** key.
   Its LED will start blinking to indicate that the timecode track is in Ready mode.

Without RC-848

5. Press the **TC GENERATE** key.
   Its LED will light and the internal timecode generator will start generating timecode.

With RC-848

5. Press **ENTER**. The lower line displays on the "Generate Reset" menu will increment.

6. Press and hold **RECORD** and hit **PLAY**. Timecode starts being recorded.

☞ *Reverse steps 5 and 6 if you want timecode to start being recorded exactly from the time point you've set. Ignore the "* no.tcode *" (No Timecode) message you'll see when puttting the DA-88 into record mode.*

7. When the tape reaches its end, press **STOP** to leave the record mode. Or, if you are using the RC-848, the tape will automatically stop.

8. To stop the timecode generator, press the **TC GENERATE** key again (or press the remote **ESCAPE**).

Check

9. **Without RC-848 Only:** Press and hold **DISPLAY** and hit ▼. The display will switch to TC mode.

10. Press **REW** to rewind the tape to the beginning.

11. Press **PLAY** to reproduce the timecode just recorded.

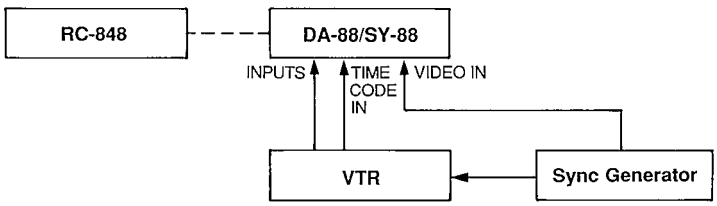
    Timecode numbers advancing in the display (or in the remote TAPE TIME window) show a successful timecode recording.

A "continue" function for experienced users who take an oath to be fully aware of and take all consequences (from the remote only) :
If ENTER is pressed after once stopping the tape with STOP, and the timecode generator, with ESCAPE, the generator will resume from the interrupted time point.

❑ Copying Timecode as well as Audio from External Units

○ Avoid copying timecode from analog machines or unstable synchronization will result. To copy audio from an analog machine, first stripe the tape you want to copy to by using the internal generator (see above), then let the DA-88 record in sync with the analog machine (see section 6).

1. Dubbing Timecode and Audio from VTRs



First, make sure the DA-88 and your VTR are both turned off. For connections, see also page 4-1.

1. Connect the timecode from the VTR to the TIME CODE IN jack of the DA-88.

2. Plug composite video signals from your sync or pattern generator (or from the VTR if you are not using those generators) into the VIDEO IN jack of the SY-88.

3. Plug audio signals from the VTR into the INPUTS jacks of the DA-88.

4. Turn on both the DA-88 and the VTR.

5. On the part of the DA-88 :

   ○ Press **CLOCK** until the VIDEO LED lights.

   ○ Press **TC REC**. Its associated LED will start blinking to show the timecode track (in the subcode area of the tape) is in Ready mode.

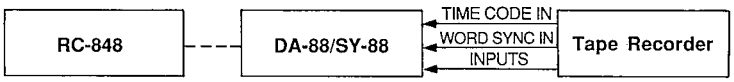
- Put a track or tracks to record audio on into Ready mode by pressing their **REC FUNCTION** switches.

6. Let the VTR start playing, and hold **RECORD** and press **PLAY** on the DA-88. The incoming timecode and audio will be laid down on the record tape.

   You can see the timecode numbers as they are coming in and being copied if the display is in its TC mode.

> **NOTE**
> It is imprerative that the timecode on the VTR has been recorded so that its frames match exactly with the video frames.

2. Dubbing Timecode and Analog Audio from Other Digital Audio Machines



First, make sure both the DA-88 and your source machine are turned off.
For connections, see also pages 4-1, 2.

1. Connect the timecode from the source machine to the TIME CODE IN jack of the DA-88.
2. Connect the audio from the source machine to the INPUTS jacks of the DA-88.
3. Turn on both the DA-88 and the source tape recorder.
4. On the part of the DA-88 :
   - Press **CLOCK** until the INT LED lights.
   - Press **TC REC**. Its LED will start blinking to show the timecode track (in the subcode area of the tape) is in Ready mode.
   - Put a track or tracks to record audio on into Ready mode by pressing their **REC FUNCTION** switches.
5. Let the source tape start playing.
6. Hold **RECORD** and press **PLAY** to put the selected tracks into Record mode. At the same time timecode also starts being copied.

3. Dubbing Timecode and Digital Audio from Other Digital Audio Machines

If your source machine conforms to :

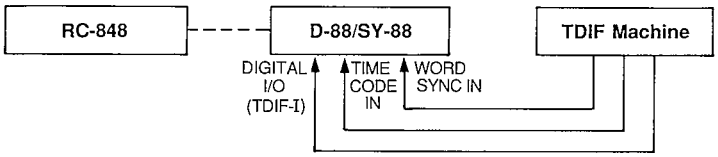
(1) AES/EBU specifications (such as TIMECODE DAT, DISC RECORDER, etc), you need the optional IF-88AE interface unit (available soon).

(2) SDIF-II specifications (such as TASCAM DA-800-24, SONY 3324, 3348, etc), you need the optional IF-88SD interface unit (available soon).

(3) TDIF-I specifications, you can follow the steps below. As of August, 1993, machines with this interface specifications are not delivered yet from any manufacturers (except for the TASCAM DA- 88).

If you want to make a copy from AES/EBU or SDIF-II machines, refer to the manual for the IF-88AE or IF-88SD, respectively.

Dubbing from TDIF-I Machines



First, make sure both the DA-88 and your digital audio source machine are turned off.
For connections, see also page 4-1.

1. Connect the timecode from the source machine to the TIME CODE IN jack of the DA-88.

2. Connect the word sync signal from the source machine to the WORD SYNC IN jack of the DA-88.

3. Plug digital audio from the source machine into the DIGITAL I/O (TDIF-I) connector of the DA-88.

4. Turn on both the DA-88 and the source digital machine.

5. On the part of the DA-88 :
   - Press **CLOCK** until the WORD LED lights.
   - Press **TC REC** to put the timecode track (in the subcode area of the tape) into Ready, as confirmed by its LED blinking.
   - Select a track or tracks to record audio on.

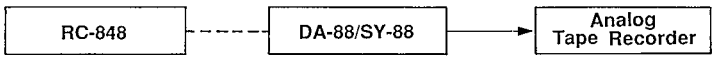
6. Let the source machine start playing.

7. Hold **RECORD** and press **PLAY** on the DA-88 to start dubbing timecode and digital audio.

> **NOTE**
> It is imprerative that the clock to which the TDIF machine is currently referenced is the same as when its tape was striped with timecode.

5-3. RECORDING TIMECODE ON OTHER AUDIO TAPE RECORDERS (Using the Timecode Generator inside the SY-88)

❑ Recording Timecode both on the DA-88 and an Analog Tape Recorder at One Time



If your analog tape recorder provides no sync (timecode) track, allocate one track on that machine to the timecode (usually this is put on the bottom track).

NOTES

- Noise reduction should be turned off on the track to record timecode.
- To achieve optimum recording quality, the tape path must be thoroughly clean. Dirty heads can cause dropouts.

On the Part of the Analog Tape Recorder

1. First, connect the SY-88's TIME CODE OUT to the input of the sync track of your analog tape recorder before turning on both machines.
2. If your analog tape recorder has a variable speed function, check to see that it is not activated. Timecode should be recorded at fixed speed.
3. Rewind the analog tape to the beginning.

On the Part of the DA-88

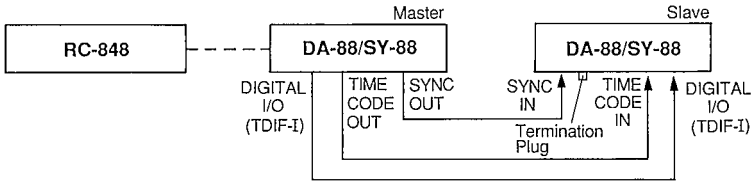
4. Set the timecode format and the generator start time as per instructions above (pp. 5-1, 2).
5. Press **TC REC**. Its LED will start blinking to indicate Record Ready mode
6. Start the timecode generator by pressing **TC GENERATE** or the remote **ENTER**.
7. Adjust the analog tape recorder's input level for -10 dB to 0 dB as read on its meter (consult the manual for your machine if necessary).
8. To start timecode recording, put both machines into record mode.
9. When timecode is recorded all the way to the end of both tapes, stop them.
10. To stop the timecode generator, press **TC GENERATE** (or the remote **ESCAPE**).
11. To check the result, follow steps 9-11 under *Recording Timecode on the DA- 88* (pp. 5-3, 4).

- By skipping step 5 and putting only your analog tape recorder at step 8, you can record timecode on the analog tape recorder only.

❑ Recording Timecode on Other Digital Audio Machines

Connect the TIME CODE OUT and WORD SYNC OUT from the SY-88 to the TIME CODE IN and WORD SYNC IN of your digital audio machine, respectively. Then you can follow the same procedure as in recording timecode on the DA-88 (pp. 5-2, 3). Consult also the manual for your external machine as required.

5-4. DUBBING AUDIO AND TIMECODE BETWEEN DA-88S AT ONE TIME



The original relationships between the audio, ABS times and timecode numbers can be copied without any alterations whatever.

The SY-88 should be installed in both the master (source) and slave (target) DA-88s. The following optional cables are also necessary:

- PW-88S sync cable
- PW-88D dubbing cable

Synchronization in this application is ABS-time based (not timecode based).

❑ Pre-operating Procedure

1. Check to see both DA-88s are turned off.

2. Set the **MACHINE ID** switch on one DA-88 to "0," and the switch on the other DA-88 to any other number.

3. Connect one end of the optional PW-88S cable to the SYNC OUT jack of the source (master) DA-88 (the one which is ID-numbered 0), and the other end of the cable to the SYNC IN jack of the other, target (slave) DA-88.

4. Connect one end of the optional PW-88D cable to the DIGITAL I/O jack of the source DA-88, and the other end of the cable to the DIGITAL I/O jack of the target DA-88.

5. Connect the TIME CODE OUT from the source machine to the TIME CODE IN on the target machine with the appropriate cable.

6. Turn on both DA-88s.

❑ Dubbing Procedure

Without RC-848

1. Press **DIGITAL IN** on the target DA-88 to put this into Digital Input mode.
2. Hold the upward key (▲) and press **DIGITAL IN** on the source DA-88. "DIGITAL" will flash in the display window.
3. Insert the master tape in the source machine, and a formatted record tape in the target machine.
4. On the part of the source machine : Check to see that all the eight **REC FUNCTION** indicators are off, and the **T/C REC** indicator too.
5. On the part of the target machine : Press the **REC FUNCTION** switches, **1-8**, to let the associated indicators light up, then press the **TC REC** key.
6. Press **CHASE** on the target machine.
7. Hold **RECORD** and press **PLAY** on the source machine, which causes the source machine to start playing and the target machine to start recording.

   ☞ *In this case, the source DA-88 cannot go into record mode regardless of whether the source tape is record- protected or not. If it is record-protected, the RECORD LED on the source DA-88 does not light.*

With RC-848

1. Press **MACHINE**. "Select" will show in the LOCATE TIME window.
2. Press **2** on the keypad (if the target machine is ID- numbered "1" ; or press **3** if it is numbered "2" and so on).
3. Press **MENU** until the LCD screen reads:

   Input Select
   Analog

4. Press either the + or – key to change the "Analog" to "Digital."
5. Press **TC REC**. Its LED will start blinking.
6. Press **REC FUNCTION 9-16** (or others depending on the machine currently selected).
7. Press **MACHINE** again. The LOCATE TIME display will read "Select" as before.
8. Press **1** on the keypad to select, this time, the source machine which must have been ID-numbered "0."
9. Get to a "Digital Dubbing" menu by pressing **MENU**.
10. Press either + or – to change the "Analog" to "Digital."
11. Check to see that the **1-8 REC FUNCTION** and **TC REC** switches are all off.
12. Press **CHASE**. The LOCATE TIME display will read "CHASE" to show sync mode is entered.
13. Select the target machine again by pressing its machine number on the keypad as you did in step 2. The number pressed will start blinking in the LOCK STATUS window.
14. Hold **RECORD** and press **PLAY** on the remote, which causes the source machine to start playing and at the same time the target machine to start recording.

6. Syncing with the DA-88 as Slave

Once the same timecode has been recorded on both the master and slave machines you can try syncing them.

If the DA-88 is referenced to its INT(ernal) clock and the CHASE MODE dip-switch is at its down/"Rechase" position, the SY-88 reads the master and slave timecode numbers, compares the two, and issues "speed-up" or "slow-down" commands to the DA-88 continually in order to keep the two machines in sync ("resolving" or "phase lock").

If the DA-88 is referenced to the WORD or VIDEO clock, the slave drops into "clock sync" when the difference between the master and slave timecode numbers decreases to a certain degree.

Whatever the clock to which the DA-88 is referenced, if the CHASE MODE dip-switch is set to its Up /"Free" mode position, the DA-88 goes into its normal play mode once synced up to the master.

☞ *If you intend to perform a synchronized rehearse, don't press REHEARSAL before CHASE. Once REHEARSAL pressed, CHASE cannot operate.*

1. Make sure of the following :

   - Your master machine is correctly connected to the DA- 88/SY-88 system.
   - The DA-88/SY-88 system is referenced to the appropriate clock.

     ☞ *If a VTR is the master and the CLOCK switch is set to VIDEO, the VIDEO IN jack of the SY-88 must be fed with a signal from which a clock can be derived regardless of VTR transport status — a signal from sync generators, pattern generators, etc. If, for example, a video output is plugged instead, and the VTR stops playing, no clocks are available; and, when play resumes, the system clock of DA-88 does not stabilize in time.*

   - The DA-88 is ID-numbered "0."
   - The CHASE MODE dip-switch is set to the desired position.
   - If you are in doubt about the type of timecode in use on the tape inserted to the DA-88, verify it as per instructions in (4), paragraph 11, page 2-2.

2. Press **CHASE**.

Without RC-848

The CHASE LED flashes to indicate that the DA-88 (slave) is "chasing," and it glows solid when the two machines are locked together.

With RC-848

"CHASE" will appear in the LOCATE TIME window. If you then press "1" on the keypad, the LOCK STATUS 1 indicator will blink, and glow solid as both machines are locked together.

Once locked together, the slave will duplicate every action of the master automatically, be it rewind, normal play, fast-forward, or stop (unless the CHASE MODE dip-switch is set to its Up/"free" mode position).

○ **To see timecode numbers as they are being read off the DA-88 tape**

Without RC-848

Hold down **DISPLAY** and press ▼, if the display is not in TC mode already.

With RC-848

The off-tape timecode numbers show in the TAPE TIME display as the DA-88 starts "chasing" the master.

○ **To see the master (external) timecode numbers**

Without RC-848

When the display is in its TC mode, hold down ▲ and press **DISPLAY**. The TC LED will blink to show the display is in its external timecode mode.

With RC-848

Switch the LCD screen to the "T/C : External" menu.

○ **To disable the synchronization**

Without RC-848

Press **CHASE** again.

With RC-848

Press **CHASE**. The LOCATE TIME display will read "CHASE." Then, press **1** on the keypad. The LOCK STATUS 1 indicator will turn off.

☞ *When both machines are running in sync, all transport controls on the DA-88 (and on the remote too) are locked out EXCEPT the DA-88's STOP. If you press and hold STOP, the DA-88 will be held stopped ; and, when releasing STOP, it will fight to return to lock with the master.* ***The remote STOP*** *does not provide such functions ; it only momentarily stops the tape whether you press or hold the key.*

Error Message "E. CLOC":
If thic message appears, first switch CLOCK to INT, then select the same code format as the incoming format (p. 5-1).

OFFSET SYNC

Offset can be entered up to a maximum of +12:00:00:00.00 or down to a minimum of -12:00:00:00.00, either before putting the slave (DA-88) into "chase" mode or when the master and slave are syncing.

❑ Manual Entry

☞ *Subframe numbers cannot be entered if CLOCK is set to VIDEO and MODE dip-switch #7 is set to its Up position.*

Without RC-848

1. Press the **DISPLAY** switch until the OFFSET LED lights (either frame or subframe display mode depending on the offset accuracy you need).

2. If you want the DA-88 to lead the master, first press and hold the ▲ key for a moment. Then —

   Use the ▲ and ▼ keys to enter the desired offset time.

   You can speed up the entry by pressing **DISPLAY** while holding down either ▲ or ▼ as you may have done when setting the start time of the internal timecode generator (p. 5-2).

With RC-848

1. Press **MENU** to get access to the "T/C : Offset" menu.

2. You have two options :
   (a) Use the + and – keys to enter the desired offset time.

   To move the cursor to the left, hold **SHIFT** and press the – key.

   To change the + to – (or vice versa), move the cursor there, and press the – (or the +).

   (b) Use the **numeric keys** to enter the desired offset time into the LOCATE TIME window. Then hold **SHIFT** and press **ENTER**. The entered time will show on the menu.

You can move the cursor to the right of the subframe first digit by means of the SHIFT and +/– keys. Then if you hold down the +/– key, the subframe numbers will increment fast. The same will occur to the frame, minute, and hour numbers if you continue to hold down the key.

To enter +12:00:00:00.00 (maximum offset time) : You cannot enter with the + and – keys. Use the **numeric keys** instead. When the numbers show in the LOCATE TIME window, hold **SHIFT** and press **ENTER**.

If the slave and master are already syncing : The slave will directly be offset and synchronized keeping the offset time distance with respect to the master.

If CHASE has not been pressed already : Press **CHASE**.

Without RC-848

To disable the offset sync : when the display is in its OFFSET mode, hold the ▼ or ▲ key and press the other. 0's will show in the display. Until you reset the offset display, the slave remains being offset.

With RC-848

To disable the offset sync : At the "T/C : Offset" menu, hold the + or – key and press the other. The offset display is reset to "0's." Note, there is no way of temporarily switching off the offset sync function; until you reset the offset display, the slave remains being offset.

❑ Auto Offset Entry *(to frame accurate only)*

You can capture the current difference between the master and slave timecode numbers and put it into the offset memory on the fly.

Without RC-848

1. Switch the display to its DIFF mode by pressing the **DISPLAY** switch.
2. At the desired moment, hold the ▼ or ▲ key and hit the other.

With RC-848

1. Press **MENU** to get access to the "T/C : Offset" menu.
2. At the desired moment, hit **ENTER**. The difference between the master and slave timecode numbers at that moment will show in the menu.

To see the timecode numbers from the machine to which the DA- 88 is slaved, press **MENU** to get access to the "T/C : External" menu. (The timecode format of the master tape also then show in the LCD screen.)

○ **To let the display show how far the slave tape is apart from the master**, press the remote **MENU** until you have access to the "T/C : Rel Diff" menu ; then, if you want, hold **SHIFT** and press **MENU** once more to have access to the "T/C : Abs Diff" menu. If you are not using the remote, press the **DISPLAY** switch until the DIFF LED lights. The display can either be frame or subframe accurate as required. The frame-accurate DIFF mode shows the absolue difference between the master and slave timecode numbers. Once locked together, the display shows the relative difference (= absolute difference - offset value). The subframe-accurate DIFF mode shows the absolute difference all the time.

"Abs Diff" and "Rel Diff":
The "absolute" difference refers to the current difference between the master and slave timecode number readings. So there will be no absolute difference between them when the slave is synced up to the master if no offset has been entered. If the slave is offset, it is synced up to the master keeping a distance corresponding to the entered offset value, so an absolute difference remains between the master and slave timecode numbers. This difference is not any other than the offset, and will be read out in the LCD screen if this is in "Abs Diff" mode, or will not be read out if in "Rel Diff" mode.

7. Timecode Out Select

ABS Time To Timecode Conversion Facility : This makes it possible to slave the DA-88 to external timecodes without going to the trouble of striping timecode on DA-88 tapes .

The ABS time can be converted into any types of timecode the SY-88 supports. The 0.00.00.00 point of ABS time becomes the 0.00.00.00 point of timecode. When selecting the 24, 25 or 30 fps format, the ABS time numbers match exactly with the timecode numbers all the time (except the frame numbers). But the 29.97 fps format code numbers do not; in the case of the 29.97 Non-Drop frame code, it will read about 59 minutes, 56 seconds when the ABS time counts up to 1 hour, and the discrepancy will become wider with time.

The converted timecode is sent out from the TIME CODE OUT jack as with timecodes read off tape or produced by the timecode generator.

Advantages of this facility :

- As said just above, there is no need for you to stripe DA-88 tapes to sync them up to external timecodes. Under some conditions, offsets will be necessary to be entered between the master and DA-88 timecode numbers.

- When work tapes copied from the same video tape are used as master tapes for audio sweetening in multiple studios where DA-88s are used as slave machines, the final mixdown can be achieved simply by syncing DA-88s via ABS time.

To convert the ABS time into timecodes, proceed as follows.

Without RC-848

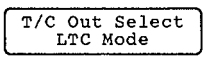
1. Hold **DISPLAY** and press ▼. The TC LED will light.
2. Press and hold either ▲ or ▼ and press the other.
3. Press **DISPLAY** twice. The display will look like this :

   t. out tc

4. Press ▲ or ▼ to change the "tc" to "Abs."
5. To switch the display back to the TC mode, press **DISPLAY**.

With RC-848

1. Press **MENU** until the LCD screen reads :



2. Press + or –. "ABS Time Mode" will show.

For the TIME CODE OUT jack to carry timecode directly from the DA-88 tape or from the SY-88 timecode generator, switch the "Abs" back to "tc," or the "ABS Time Mode" back to "LTC Mode".

8. Fs Shift Select

The Fs Shift Select feature allows the DA-88/SY-88 system to meet the pull down and pull up requirements in specific NTSC environments.

Without RC-848

1. Hold down the **DISPLAY** key and press the down (▼) key. The tape timecode display mode will be enabled, as confirmed by the TC LED being lit.

2. Hold down the up (▲) key and press the **Fs** key to enable the Fs Shift Select function.

3. Select the desired optional mode by means of the up and down keys. The display will switch as follows :

   PULL OFF
   ▲ ▼
   PUL UP. dF (pull up drop frame)
   ▲ ▼
   PUL UP. nd (pull up non drop)
   ▲ ▼
   PUL dN. (pull down)

With RC-848

1. Press **MENU** to access the Fs Shift Select menu. The screen will look like this :

   ```
   Fs Shift Select
        Off
   ```

2. Select the desired optional mode by means of the + (plus) and – (minus) keys.

   OFF
   + ↑ ↓ –
   Pull Up Drop
   + ↑ ↓ –
   Pull Up Non Drop
   + ↑ ↓ –
   Pull Down

- When the Fs Shift Select function is enabled the DA-88/SY- 88 system is automatically referenced to :
  30 NDF — if in Pull Down mode.
  29.97 NDF — if in Pull Up Non Drop frame mode.
  29.97 DF — if in Pull Up Drop frame mode.
  You cannot select other frame codes arbitrarily.

- If you are using the RC-848 the "T/C Frame Select" menu shows an asterisk (*), reminding you that this menu is locked out.

- When selecting either Pull Up mode, set the CLOCK switch to INT for the tape to record or play at 0.1% "pulled up" speed.

NOTE

Change the code frame setting as required before proceeding to any operations which don't need the Fs Shift Select function any more. Otherwise, the DA-88/SY-88 is referenced to the same type of code as in the Fs Shift Select mode you have just exited.

9. Setting a Park Position (starting with DA-88 sys.con. version 3.00/SY-88 version 3.00)

You can have the slave DA-88 transport park at the desired point for it to start playing to optimum timing with respect to the master.

Pre-setting procedure

First, have the slave DA-88 lock to the master transport as follows :

1. Play the master.

2. Play the slave DA-88.

3. Press **DISPLAY** on the slave as many times as necessary to activate its frame accurate DIFF mode (see page 2-1 if necessary).

4. To capture the current difference between the master an slave timecode numbers, use the Auto Offset Entry feature by holding either the down (▼) or the up (▲) key and hitting the other.

5. Press **CHASE** on the slave.

6. When the slave locks to the master, stop both machines by pressing **STOP** on the master.

Measuring the Current Park Position

7. Hold down the up (▲) key and press **DISPLAY** on the slave DA-88, then press either the up (▲) or the down (▼) key to activate a park position measurement mode.

   "tESt On" will appear in the display window.

   (Each time you activate the park position measurement mode, all previously set points are reset to 00.)

8. Press **DISPLAY** to activate the frame accurate DIFF mode as before.

9. Play the master.

   About 2 seconds later, the time numbers in the display will stabilize. The numbers show the time the slave takes to settle down in play mode. That is to say, a tight play start of the slave will be ensured by setting the park position of the slave the displayed time ahead of the current park position.

Automatic Accommodation of the Park Position

10. Hold down either the up (▲) or the down (▼) key and press the other.

    "At. P.PoSi" (At Park Position) will appear in the display window and a new park position will be set up for the lag shown to be compensated for.

    When the setup is complete and the park position setting mode is disabled as a result, the "At. P.PoSi" display disappears and the slave DA-88 goes into chase mode and is quick to lock to the master.

Manual Positioning

The park position of the slave can also manually be set up or trimmed as follows :

1. Press **DISPLAY** as many times as necessary to activate the frame accurate DIFF mode.

2. Hold down the down (▼) key and press **DISPLAY** to activate the park position setting mode. "P.PoS 010" will appear in the display window, showing that the slave will park 10 frames ahead of the otherwise "will be" point. To change this default setting, perform the following steps.

3. Each time you press the up (▲) or the down (▼) key the display will increment/decrement in 1 frame steps. You cannot enter 2 seconds or more. The minimum setting is 0 second.

4. When the desired numbers are displayed, press **DISPLAY** to switch the display back to its DIFF mode.

Appendix 1. Specifications and Error Messages

SPECIFICATIONS

1. General

Type : Slot-in mount

2. I/O

Time Code Input (RCA jack)

Input Impedance : 10k ohms

Input Level : 0.2 Vp-p to 5.0 Vp-p

Timecode Formats Supported : SMPTE 30, 29.97 Drop, 29.97 Non Drop, EBU 25, and Film 24 Frames/second

Timecode Output (RCA jack)

Output Impedance : 1k ohms

Output Level : 2 Vp-p (Can be set for 0.6 Vp-p)

Timecode Formats Supported : SMPTE 30, 29.97 Drop, 29.97 Non Drop, EBU 25, and Film 24 Frames/second

Video Input/Thru (BNC connector)

Type : NTSC or PAL ;
Negative Sync Composite Video or Sync Composite Video Signal

Level : 1 Vp-p, +/-0.2

MIDI Input/Output/Thru (5 pin DIN connector)

RS-422 (9 pin D-sub) : Conforms to RS-422 specifications

❑ Changes in specifications and features may be made without notice or obligation.

ERROR MESSAGES

Et.codE

A different timecode than your selection is coming in. Either select (pp. 5-1, 2) or plug the matching timecode, depending on the situation.

no.t.codE

No timecode is coming in. Check if timecode is correctly connected and the external machine is sending timecode.

no. Abs-t

You tried to record timecode on an unformatted tape or in an unformatted section. Timecode recording is automatically disabled.

Appendix 2. Supplement for 9-pin Control

The user should not attempt to adjust any DIP switches or other parts inside the enclosure. All internal adjustments should be referred to qualified service personnel.

This supplement describes operation of the SY-88, software version 3.06; via the 9-pin socket. Previous versions do not support the functions described here.

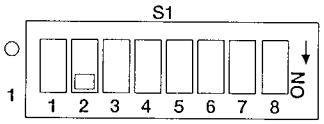
The controller

Using the 9-pin socket, the SY-88 can be controlled via the standard method used for VTR, so VTR or DAT controllers can also be used for controlling the SY-88/DA-88.

Video reference

When the SY-88 is used in Video Emulation Mode, a mutual video reference signal should be fed to both the SY-88 and the video editor. After selecting "VIDEO" for the system clock source using the "CLOCK" button located on the front panel of the DA-88, confirm that the DA-88 isn't displaying the "E. CLOC" error message.

SY-88 switches



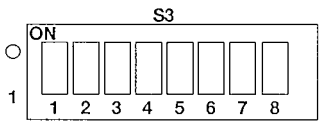
"0" indicates that the lever is up and,
"1" indicates that the lever is down.

S1 - #1: 75 ohm termination switch for the video reference input
"1": on "0": off

S1 - #2: MIDI / 9 pin
"1": 9 pin "0": MIDI
Should be set to "1" (9 pin).

S1 - #7: Video sync playback on/off
"1": off "0": on
Should be set to "0" (video sync on) if in video emulation mode.

S1 - #8: Timecode output mode selection
"1": the output mode is "A"
"0": the output mode is "B"
A mode: When the tape is stopped (excluding the pause state), no timecode is output. When in play mode, normal timecode is output.
In other states than above:
physical TC speed is about the normal play speed, and
frame address embedded in TC indicates current frame address, meaning that sometimes the address repeats in two or more consecutive frames if the tape is running in a slower speed than the play speed, or the address leaps if the speed is faster.
B mode: Only when the tape is running in a speed faster than play speed regardless of the tape direction,
the frame address embedded in the TC increases one at each frame over 5 frames in a row.
Physical TC speed is about the normal play speed.
Otherwise, the TC output manner is identical to the A mode.



Two 8-pole switches are mounted side by side. The one which is closer to the edge of the board is S3.

"0": the side of the switch marked "ON"
"1": the other side

S3 - #1,2,3: Device ID

These switches determine how to reply to the device-id-request-command.

S3-			ID	
#1	#2	#3	Hexadecimal	Machine
0	0	0	7 x 01	PCM-7050
1	0	0	0 x 50	BVH-3000
0	1	0	1 x 1C	BVU-950
1	1	0	2 x 25	BVW-75
0	0	1	1 x 4C	VO-9850
1	0	1	0 x 11	BVH-2000
0	1	1	4 x 00	DVR-10
1	1	1	F x 1D	TASCAM

Note: x=1 when timecode frame mode is "25" (EBU)
x=0 when timecode frame mode is DF, ND or 24 (SMPTE)

Seven id's from the top of the list are provided for the emulation mode. Because a video editor may use different controlling methods for different machines, the results of video emulation may be different according to which machine is being emulated. Roughly, the characteristics of the DA-88 are more similar to those machines listed nearer the top.

If your editor automatically determines it's controlling method from the device id reply, try id's starting from the top of the list.

As for other types of controllers, the type of machine -- i.e. the control method -- is fixed or selected by the operator from certain candidates. If the available machine type does not appear in the list, try the most similar machine's id.

If the controller recognizes the TASCAM id and controls the SY-88/DA-88 by means other than by video emulation, the S3#1,2,3 should be set to "111."

S3 - #4,5: Track Mapping

The video control protocol can specify four analog audio tracks and eight digital audio tracks independently.

The SY-88 provides some patterns of mapping between tracks specified in the 9 pin commands and the DA-88 tracks.

Note that this is not the mapping between the DA-88 tracks and the user interface of the editor, but of the DA-88 tracks and the command communication. The editor user interface may have "Audio track 1". Which track represented in the command communication corresponds to the Audio Track 1, should be determined in the side of the controller.

DA-88 Track	#4="0"	#4="1"(Pair Mode)		
	#5="0"	#5="1"	#5="0"	#5="1"
1	Analog 1	Digital 1	Analog 1	Analog 1
2	Analog 2	Digital 2	Analog 2	Analog 1
3	Analog 3	Digital 3	Analog 3	Analog 2
4	Analog 4	Digital 4	Analog 4	Analog 2
5	Analog 1	Digital 5	Analog 1	Analog 3
6	Analog 2	Digital 6	Analog 2	Analog 3
7	Analog 3	Digital 7	Analog 3	Analog 4
8	Analog 4	Digital 8	Analog 4	Analog 4

S3 - #6: FF/REW speed

When the SY-88 receives a FF/REW command from the 9-pin socket, the DA-88 enters:

shuttle mode with a speed 8 times the play speed if S3#6=0, or
FF/REW mode with maximum speed of 100 times if S3#6=1.

A controller may have two methods for locating on tape.

a) It sends a locate command (cue up with data command) .
b) It sends FF/REW or shuttle commands

In case of "b", using 100 times FF/REW for locating tape will cause inaccurate result or repeating overshoots around the destination. This switch is provided to prevent these problems.
Set to "0" for type "b" locating.

How to know which way is being used:

1) When the SY-88 receives a locate command (meaning that the controller type is "a"), the time display on the DA-88 front panel shows the destination time in a few seconds. While watching the display, let the controller enter a locate operation.
2) When the controller is locating the tape, the front panel LED's of the DA-88 will:
   in case of "a"
   the FF/REW LED blinks
   in case of "b"
   if S3#6=0: the Shuttle LED blinks, or
   if S3#6=1: the FF/REW LED lights or the Shuttle LED blinks.

S3 - #7: Track arming from the 9-pin socket

"0" : track arming from the 9 pin socket is enabled
"1" : track arming from the 9 pin socket is disabled

When this switch is set as "1", the track arming command (edit preset command) from the 9 pin socket will be ignored, meaning that the track selections from the DA-88 front panel or remote controllers are always effective.

The "0" state of this switch does not disable the manual operation, but the result will be canceled if an edit preset command comes.

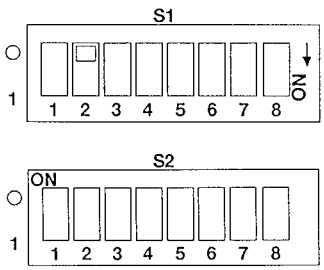
S3 - #8: Not used

Appendix 3. Supplement for MIDI Control

The user should not attempt to adjust any DIP switches or other parts inside the enclosure. All internal adjustments should be referred to qualified service personnel.

This supplement describes special notice on MMC implementation of the SY-88, software version 3.06

DIP switch polarity



S1: on the rear panel of the SY-88
"0" indicates that the lever is up and,
"1" indicates that the lever is down.

S2: on the SY-88 board
Two 8-pole switches are mounted side by side. The one which is not closer to the edge of the board is S2.
"0": the side of the switch marked "ON"
"1": the other side

MTC output

S2: #8 determines the MTC output mode.
S2: #8=1 the SY-88 does not output MTC
S2: #8=0 the SY-88 outputs MTC
This is the initial condition at the power is on. If an MIDI TIMECODE COMMAND comes later, the MTC output status will be changed.

Commands

09: PAUSE
The DA-88 enters the STOP mode as well as when it receives an MMC Stop command.

4A: GENERATOR COMMAND
The SY-88 can operate 00:Stop and 01:Run, while it can not operate 02:Copy/Jam.

Information Fields

4C: RECORD MODE
The RECORD MODE setting affects only MMC record commands. Record commands from DA-88 front panel or the remote controllers will not be affected.

51: RECORD MONITOR
Relations between each mode and the DA-88 status are shown below.

	DA-88 Status	
Mode	**Auto Input**	**Insert**
00	Off	On
01	On	On
02	On	Off

55: PLAY SPEED REFERENCE
Can not be set via MIDI.
Returned data for a READ comand will be
00 when the DA-88 clock source is Internal, or
01 when the DA-88 clock source is Word or Video.

59: RESOLVED PLAY MODE
Can not be set via MIDI.
Returned data for a READ command will be
00 (Normal) when S1:#7 is "1", or
01 (Free Resolve mode) when S1:#7 is "0."

5A: CHASE MODE
Can not be set via MIDI.
Returned data for a READ command will be
00 (Absolute Standard mode) when S1:#3 is "1", or
01 (Free Resolve mode) when S1:#3 is "0."

5C: GENERATOR SET UP
The "Frame Sync Reference for Run mode" can not be set via MIDI.

5E: MIDI TIMECODE COMMAND TALLY
The initial condition at the power up is determined by the DIP switch. If an MIDI TIMECODE COMMAND comes later, the MTC output status will be changed.

S2: #8=1	mm=00 the SY-88 does not output MTC
S2: #8=0	mm=02 the SY-88 outputs MTC

5F: MIDI TIMECODE SET UP
MTC flags
a="Transmit while stopped"
The initial condition is
"1" (Continue transmission) when S2 #6=0, or
"0" (No MTC output while stopped) when S2 #6=1.
Can be changed via MMC.
b="Stopped" data type
Always "1" (full message).
Can not be changed.
c="Transmit while fast"
"1" (Continue transmission) when S2 #7=0, or
"0" (No MTC output while fast) when S2 #7=1.
Can be changed via MMC.
d="Fast" data type
Always "1" (full message).
Can not be changed.
e="Transmit userbits"
Always "0" (Inhibit).
Can not be changed.
f="MMC Response cable mute"
Always "0" (MTC will be transmitted on the MMC Response cable).
Can not be changed.
Timecode Source
Can not be changed via MIDI.
Returned data for a READ command will be
when the generator on the SY-88 is stopped,
01 (Selected Timecode) if S1#6=1, or
02 (Selected Master code) if S1#6=0
or when the SY-88 generator is running,
06 (Generator Timecode).

Device Numbers

Device No.	S2 1 2 3 4
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

To yield the SY-88 to controllers with MMC standard, you have to number the SY-88 the same as on the part of the controller in use.

Device numbers (also called channel numbers, device ID numbers or others) you can assign to the SY-88 is from 1 to 16 depending on the setting of dip-switches 2-1 to 4 as shown in table (where ▯ shows On/Up position, and ▯ shows Off/Down position).

If the device numbers your controller can handle start from 0 (not from 1), add 1 to the device number you assigned to the SY-88 *on the part of your controller*. The sum is the device number you are going to select with "S 2" (e.g. if you assign 1 to the SY-88 on the part of the controller, the SY-88 must be numbered 2 on the part of the SY-88).

If you use a single controller to control multiple units with MMC standard, each of them must have a different device number. The same is also true for the same model units (e.g. if two or more SY-88s are connected to your controller, you have to assign a different number to each of them as you'll do on the part of the controller).

MIDI DIAGRAMS

Through its MIDI jacks the SY-88 can :

- Send MTC for interfacing SMPTE/EBU code-based units to MIDI units.
- Send and receive MMC commands for the DA-88/SY-88 system to be controlled from units following MMC standards.

Bit Map Array of MMC Commands

Byte	Bit 7	Bit 6(40H)	Bit 5(20H)	Bit 4(10H)	Bit 3(08H)	Bit 2(04H)	Bit 1(02H)	Bit 0(01H)
c0	- 0	(06) RECORD STROBE	(05) REWIND	(04) FAST FORWARD	(03) DEFERRED PLAY	(02) PLAY	(01) STOP	(00) reserved
c1	- 0	(0D) MMC RESET	(0C) COMMAND ERROR RESET	(0B) CHASE	(0A) EJECT	(09) PAUSE	(08) RECORD PAUSE	(07) RECORD EXIT
c2	- 0	(14)	(13)	(12)	(11)	(10)	(0F)	(0E)
c3	- 0	(1B)	(1A)	(19)	(18)	(17)	(16)	(15)
c4	- 0	- 0	- 0	- 0	(1F)	(1E)	(1D)	(1C)
c5	- 0	(26)	(25)	(24)	(23)	(22)	(21)	(20)
c6	- 0	(2D)	(2C)	(2B)	(2A)	(29)	(28)	(27)
c7	- 0	(34)	(33)	(32)	(31)	(30)	(2F)	(2E)
c8	- 0	(3B)	(3A)	(39)	(38)	(37)	(36)	(35)
c9	- 0	- 0	- 0	- 0	(3F)	(3E)	(3D)	(3C)
c10	- 0	(46) SEARCH	(45) VARIABLE PLAY	(44) LOCATE	(43) UPDATE	(42) READ	(41) MASKED WRITE	(40) WRITE
c11	- 0	(4D) ADD	(4C) MOVE	(4B) MTC COMMAND	(4A) GENERATOR COMMAND	(49) ASSIGN SYS.MAS	(48) STEP	(47) SHUTTLE
c12	- 0	(54) DEFERRED VARI.PLAY	(53) COMMAND SEGMENT	(52) GROUP	(51) EVENT	(50) PROCE-DURE	(4F) DROP FR. ADJUST	(4E) SUBTRACT
c13	- 0	(5B)	(5A)	(59)	(58)	(57)	(56)	(55) REC STROBE VARIABLE
c14	- 0	- 0	- 0	- 0	(5F)	(5E)	(5D)	(5C)
c15	- 0	(66)	(65)	(64)	(63)	(62)	(61)	(60)
c16	- 0	(6D)	(6C)	(6B)	(6A)	(69)	(68)	(67)
c17	- 0	(74)	(73)	(72)	(71)	(70)	(6F)	(6E)
c18	- 0	(7B)	(7A)	(79)	(78)	(77)	(76)	(75)
c19	- 0	- 0	- 0	- 0	(7F) RESUME	(7E)	(7D)	(7C) WAIT

Bit Map Array of Responses/Information Fields

Byte	Bit7	Bit6 (40H)	Bit5 (20H)	Bit4 (10H)	Bit3 (08H)	Bit2 (04H)	Bit1 (02H)	Bit0 (01H)
r0	- 0	(06) GENERATOR TIME CODE	(05) LOCK DEVIATION	(04) ACTUAL OFFSET	(03) REQUESTED OFFSET	(02) SELECTED MASTER CODE	(01) SELECTED TIME CODE	(00) reserved
r1	- 0	(0D) GP5	(0C) GP4	(0B) GP3	(0A) GP2	(09) GP1	(08) GP0/LOCATE. POINT	(07) MTC INPUT
r2	- 0	(14)	(13)	(12)	(11)	(10)	(0F) GP7	(0E) GP6
r3	- 0	(1B)	(1A)	(19)	(18)	(17)	(16)	(15)
r4	- 0	- 0	- 0	- 0	(1F)	(1E)	(1D)	(1C)
r5	- 0	(26) Short GENTOR TIME CODE	(25) Sh't LOCK DEVIATION	(24) Sh't ACTUAL OFFSET	(23) Sh't REQ'D OFFSET	(22) Short SEL'D MASTER CODE	(21) Short SEL'D TIME CODE	(20) reserved
r6	- 0	(2D) Short GP5	(2C) Short GP4	(2B) Short GP3	(2A) Short GP2	(29) Short GP1	(28) Short GP0 LOCATE POINT	(27) Short MTC INPUT
r7	- 0	(34)	(33)	(32)	(31)	(30)	(2F) Short GP7	(2E) Short GP6
r8	- 0	(3B)	(3A)	(39)	(38)	(37)	(36)	(35)
r9	- 0	- 0	- 0	- 0	(3F)	(3E)	(3D)	(3C)
r10	- 0	(46) SEL'D TC SOURCE	(45) TIME STANDARD	(44) CMD ERROR LEVEL	(43) COMMAND ERROR	(42) RESPONSE ERROR	(41) UPDATE RATE	(40) SIG'TURE
r11	- 0	(4D) RECORD STATUS	(4C) RECORD MODE	(4B) FAST MODE	(4A) STOP MODE	(49) VELOCITY TALLY	(48) MOTION CTL TALLY	(47) SEL'D TC USERBITS
r12	- 0	(54) STEP LENGTH	(53) TRACK INP MONITOR	(52) TRACK SYNC MONITOR	(51) RECORD MONITOR	(50) GLOBAL MONITOR	(4F) TRACK REC READY	(4E) TRACK REC STATUS
r13	- 0	(5B) GENERATOR CMD TALLY	(5A) CHASE MODE	(59) RESOLVED PLAY MODE	(58) CONTROL DISABL	(57) LIFTER DEFEAT	(56) FIXED SPEED	(55) PLAY SPEED REFERENCE
r14	- 0	- 0	- 0	- 0	(5F) MTC SETUP	(5E) MTC CMD TALLY	(5D) GENERATOR USERBITS	(5C) GENERATOR SETUP
r15	- 0	(66)	(65) FAILURE	(64) RESPONSE SEGMENT	(63) VITC INSERT ENABLE	(62) TRACK MUTE	(61) EVENT RESPONSE	(60) PROCEDURE RESPONSE
r16	- 0	(6D)	(6C)	(6B)	(6A)	(69)	(68)	(67)
r17	- 0	(74)	(73)	(72)	(71)	(70)	(6F)	(6E)
r18	- 0	(7B)	(7A)	(79)	(78)	(77)	(76)	(75)
r19	- 0	- 0	- 0	- 0	(7F) RESUME	(7E)	(7D)	(7C) WAIT

Synchronizer Board
Model SY-88

MIDI Implementation Chart

Date: Aug., 1993
Version: 1.00

Function...		Transmitted	Recognized	Remarks
Basic Channel	Default	×	×	
	Changed	×	×	
Mode	Default	×	×	
	Messages	×	×	
	Altered	* * * * * * * * * * * * * * *	×	
Note Number:		×	×	
	True voice	* * * * * * * * * * * * * * *	×	
Velocity	Note ON	×	×	
	Note OFF	×	×	
After Touch	Key's	×	×	
	Ch's	×	×	
Pitch Bend		×	×	
Control Change		×	×	
Prog Change:		×	×	
	True #	* * * * * * * * * * * * * * *	×	
System Exclusive		○	○	*1
Common	: Song Pos	×	×	
	: Song Sel	×	×	
	: Tune	×	×	
System Real Time	: Clock	×	×	
	: Commands	×	×	
Aux Messages	: Local ON/OFF	×	×	
	: All Notes OFF	×	×	
	: Active Sense	×	×	
	: Reset	×	○	
Notes		*1 MMC RP Ver 1.00 (T, R) Identity Request (R), Identity Reply (T)		
	(T) : Transmitted	MTC Quarter Frame Message (T)		
	(R) : Recognized			

Mode 1: OMNI ON. POLY Mode 2 : OMNI ON. MONO ○ : YES
Mode 3: OMNI OFF. POLY Mode 4 : OMNI OFF, MONO × : NO

THIS DIGITAL APPARATUS DOES NOT EXCEED THE CLASS B LIMITS FOR RADIO NOISE EMISSIONS FROM DIGITAL APPARATUS AS SET OUT IN THE RADIO INTERFERENCE REGULATIONS OF THE CANADIAN DEPARTMENT OF COMMUNICATIONS.

LE PRESENT APPAREIL NUMERIQUE N'EMET PAS DE BRUITS RADIOELECTRIQUES DEPASSANT LES LIMITES APPLICABLES AUX APPAREILS NUMERIQUES DE CLASSE B PRESCRITES DANS LE REGLEMENT SUR LE BROUILLAGE RADIOELECTRIQUE EDICTE PAR LE MINISTERE DES COMMUNICATIONS DU CANADA.

Bescheinigung des Herstellers/Importeurs

Hiermit wird bescheinigt, daß der/die/das

Sync-Steckkarte SY-88 für DA-88

(Gerät, Typ, Bezeichnung)

in Übereinstimmung mit den Bestimmungen der

AMTSBLATT 163/1984, VFG 1045/1984, VFG 1046/1984

(Amtsblattverfügung)

funk-entstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

TEAC CORPORATION

Name des Herstellers/Importeurs

For U.S.A.

TO THE USER

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against interference in a residential area. This device generates and uses radio frequency energy and if not installed and used in accordance with the instructions, it may cause interference to radio or TV reception. If this unit does cause interference with TV or radio reception you can try to correct the interference by one or more of the following measures :

a) Reorient or relocate the receiving antenna.
b) Increase the separation between the equipment and the receiver.
c) Plug the equipment into a different outlet so that it is not on the same circuit as the receiver.
If necessary, consult the dealer or an experienced radio/TV technician for additional suggestions.

CAUTION
Changes or modifications to this equipment not expressly approved by TEAC CORPORATION for compliance could void the user's authority to operate this equipment.

TASCAM

TEAC Professional Division

SY-88

TEAC CORPORATION	3-7-3, Nakacho, Musashino-shi, Tokyo 180, Japan Phone: (0422) 52-5081
TEAC AMERICA, INC.	7733 Telegraph Road, Montebello, California 90640 Phone: (213) 726-0303
TEAC CANADA LTD.	340 Brunel Road, Mississauga, Ontario L4Z 2C2, Canada Phone: 905-890-8008
TEAC UK LIMITED	5 Marlin House, Marlins Meadow, The Croxley Centre, Watford, Herts. WD1 8YA, U.K. Phone: 0923-819631
TEAC DEUTSCHLAND GmbH	Bahnstrasse 12, 65205 Wiesbaden-Erbenheim, Germany Phone: 0611-71580
TEAC FRANCE S.A.	17, Rue Alexis-de-Tocqueville, CE 005 92182 Antony Cedex, France Phone: (1) 42.37.01.02
TEAC BELGIUM NV/SA	143C Woluwelaan, 1831 Machelen-Diegem, Belgium Phone: (02) 725 6555
TEAC NEDERLAND BV	Perkinsbaan 11, 3439 ND Nieuwegein, Nederland Phone: 03-402-30229
TEAC AUSTRALIA PTY., LTD. A.C.N. 005 408 462	106 Bay Street, Port Melborne, Victoria 3207, Australia Phone: (03) 646-1733
TEAC ITALIANA S.p.A.	Via C. Cantù 5, 20092 Cinisello Balsamo, Milano, Italy Phone: 02-66010500

PRINTED IN JAPAN 0797U2 M-0841J